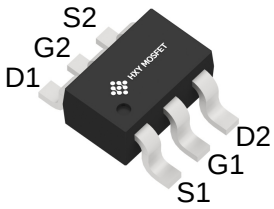
NX3008NBKS,115

Dual N-Channel Enhancement Mode MOSFET

Description

The NX3008NBKS,115 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.



SOT-363

General Features

V_{DS} = 30V I_D =0.35 A

$R_{DS(ON)}$ < 1.4Ω @ V_{GS}=4.5V

ESD protection up to 2 kV

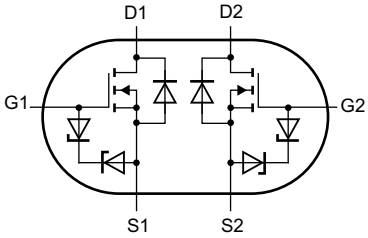
Application

Relay driver

High-speed line driver

Low-side loadswitch

Switching circuits



Dual N-Channel MOSFET

Package Marking and Ordering Information

Product ID	Pack	Packaging	Qty(PCS)
NX3008NBKS,115	SOT-363	Tape	3000

Absolute Maximum Ratings (T_C=25°C unless otherwise noted)

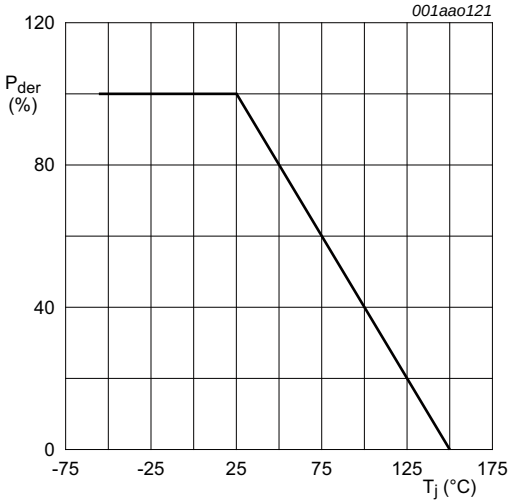
Symbol	Parameter	Limit	Unit
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	±8	V
I_D	Drain Current-Continuous [1] V_{GS} =4.5V; Tamb=25°C V_{GS} =4.5V; Tamb=100°C	 350 230	mA
I_{DM}	Drain Current-Continuous Tamb=25°C; single pulse; tp≤ 10us	1.4	A
P_{tot}	Total power dissipation Tamb=25°C Tap=25°C	 280 [2] 320 [1] 990	mW
	Tamb=25°C [2]	445	
T_J,T_{amb}	Operating Junction and ambient temperature	-55 To 150	°C
T_{stg}	storage temperature	-65 To 150	°C

1. Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated, mounting pad for drain 1 cm^2.
2. Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

Electrical Characteristics (T_A=25°C unless otherwise noted)

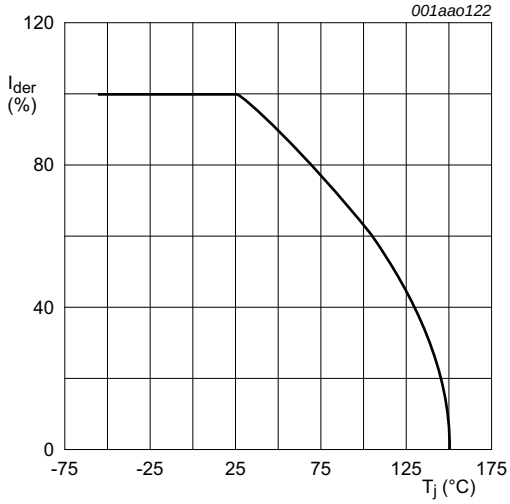
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics (per transistor)						
$V_{(BR)DSS}$	drain-source breakdown voltage	I_D = 250 µA; V_{GS} = 0 V; T_j = 25 °C	30	-	-	V
V_{GSth}	gate-source threshold voltage	I_D = 250 µA; V_{DS} = V_{GS}; T_j = 25 °C	0.6	0.9	1.1	V
I_{DSS}	drain leakage current	V_{DS} = 30 V; V_{GS} = 0 V; T_j = 25 °C	-	-	1	µA
		V_{DS} = 30 V; V_{GS} = 0 V; T_j = 150 °C	-	-	10	µA
I_{GSS}	gate leakage current	V_{GS} = 8 V; V_{DS} = 0 V; T_j = 25 °C	-	0.2	1	µA
		V_{GS} = -8 V; V_{DS} = 0 V; T_j = 25 °C	-	0.2	1	µA
		V_{GS} = 4.5 V; V_{DS} = 0 V; T_j = 25 °C	-	10	-	nA
		V_{GS} = -4.5 V; V_{DS} = 0 V; T_j = 25 °C	-	10	-	nA
		V_{GS} = 2.5 V; V_{DS} = 0 V; T_j = 25 °C	-	1	-	nA
		V_{GS} = -2.5 V; V_{DS} = 0 V; T_j = 25 °C	-	1	-	nA
R_{DSon}	drain-source on-state resistance	V_{GS} = 4.5 V; I_D = 350 mA; T_j = 25 °C	-	1	1.4	Ω
		V_{GS} = 4.5 V; I_D = 350 mA; T_j = 150 °C	-	1.8	2.5	Ω
		V_{GS} = 2.5 V; I_D = 200 mA; T_j = 25 °C	-	1.4	2.1	Ω
		V_{GS} = 1.8 V; I_D = 10 mA; T_j = 25 °C	-	2	2.8	Ω
g_{fs}	forward transconductance	V_{DS} = 10 V; I_D = 350 mA; T_j = 25 °C	-	310	-	mS
Dynamic characteristics (per transistor)						
$Q_{G(tot)}$	total gate charge	V_{DS} = 15 V; I_D = 350 mA; V_{GS} = 4.5 V; T_j = 25 °C	-	0.52	0.68	nC
Q_{GS}	gate-source charge		-	0.17	-	nC
Q_{GD}	gate-drain charge		-	0.08	-	nC
C_{iss}	input capacitance	V_{DS} = 15 V; f = 1 MHz; V_{GS} = 0 V; T_j = 25 °C	-	34	50	pF
C_{oss}	output capacitance		-	6.5	-	pF
C_{rss}	reverse transfer capacitance		-	2.2	-	pF
$t_{d(on)}$	turn-on delay time	V_{DS} = 20 V; R_L = 250 Ω; V_{GS} = 4.5 V; $R_{G(ext)}$ = 6 Ω; T_j = 25 °C	-	15	30	ns
t_r	rise time		-	11	-	ns
$t_{d(off)}$	turn-off delay time		-	69	138	ns
t_f	fall time		-	19	-	ns
Source-drain diode (per transistor)						
V_{SD}	source-drain voltage	I_S = 350 mA; V_{GS} = 0 V; T_j = 25 °C	0.47	0.85	1.2	V

Typical Characteristics



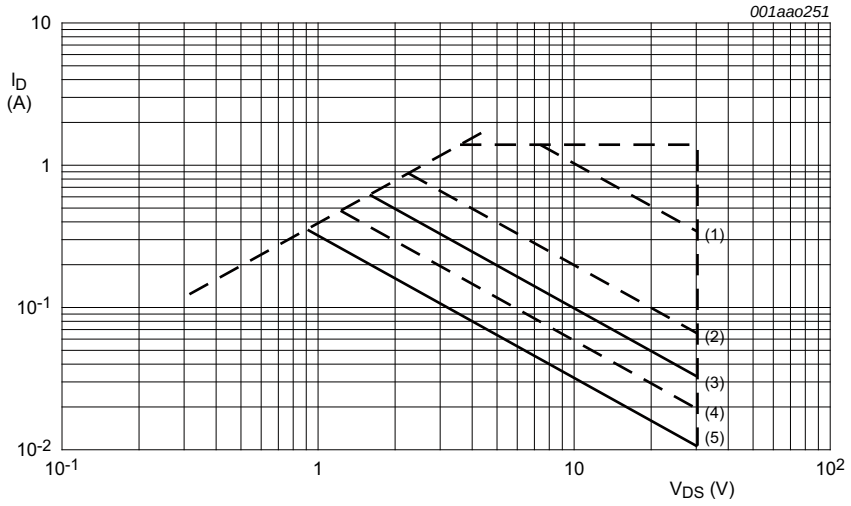
$$P_{der} = \frac{P_{tot}}{P_{tot(25°C)}} \times 100\,\%$$

Fig 1. Normalized total power dissipation as a function of junction temperature



$$I_{der} = \frac{I_D}{I_{D(25°C)}} \times 100\,\%$$

Fig 2. Normalized continuous drain current as a function of junction temperature



I_{DM} is a single pulse

(1) t_p = 1 ms

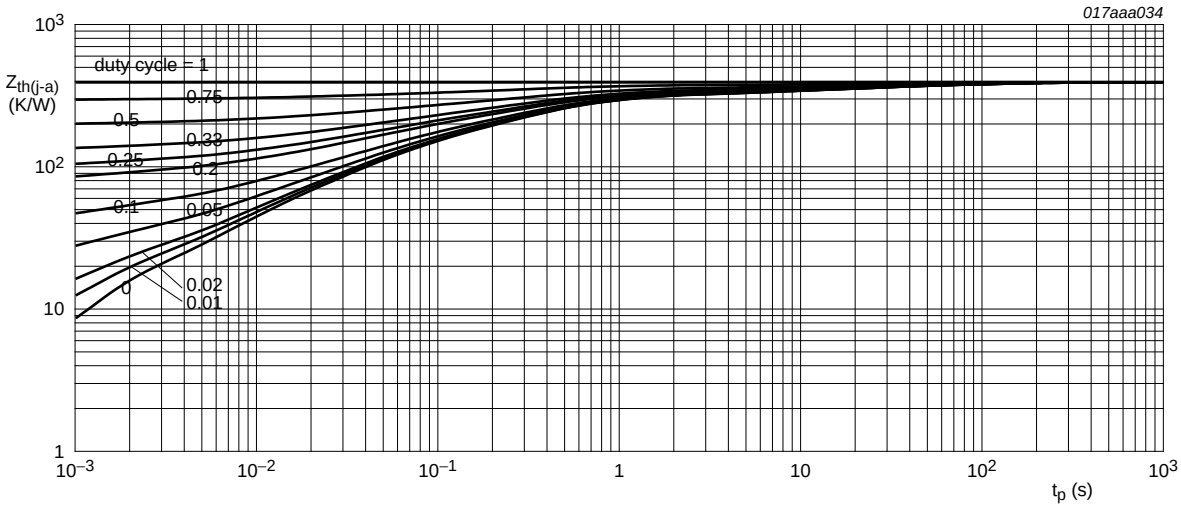
(2) t_p = 10 ms

(3) DC; T_{sp} = 25 °C

(4) t_p = 100 ms

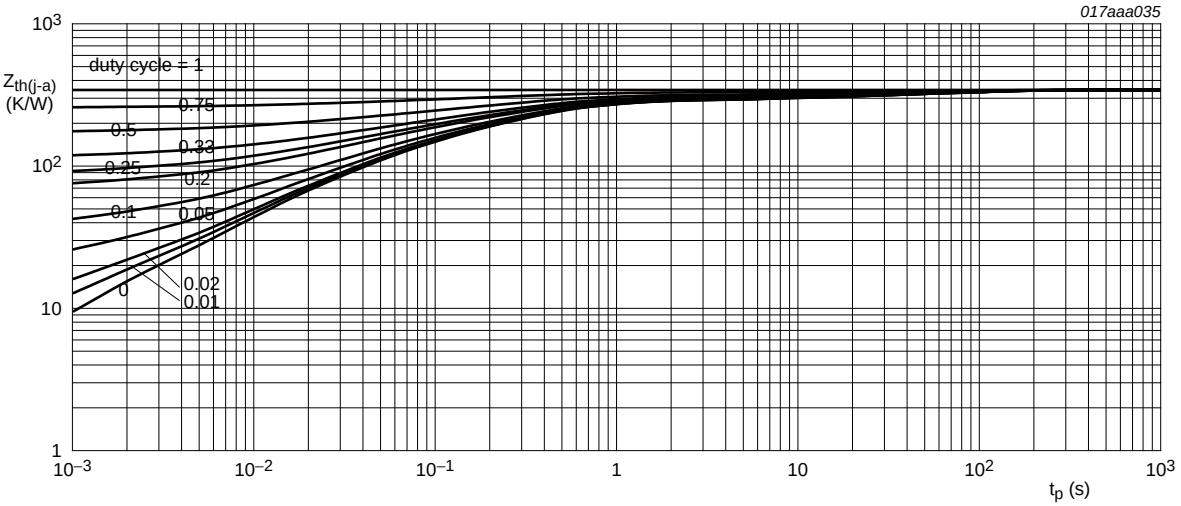
(5) DC; T_{amb} = 25 °C; 1 cm^2 drain mounting pad

Fig 3. Safe operating area; junction to ambient; continuous and peak drain currents as a function of drain-source voltage



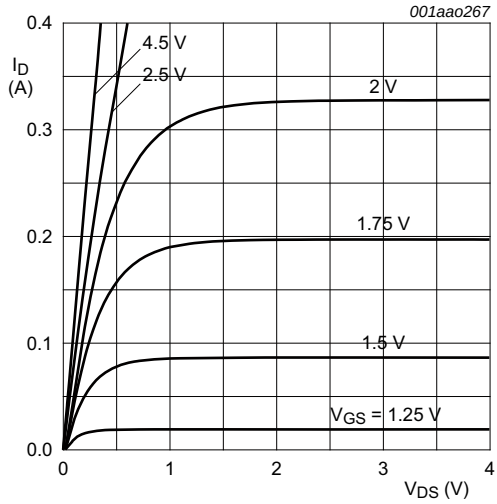
FR4 PCB, standard footprint

Fig 4. Per transistor: Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



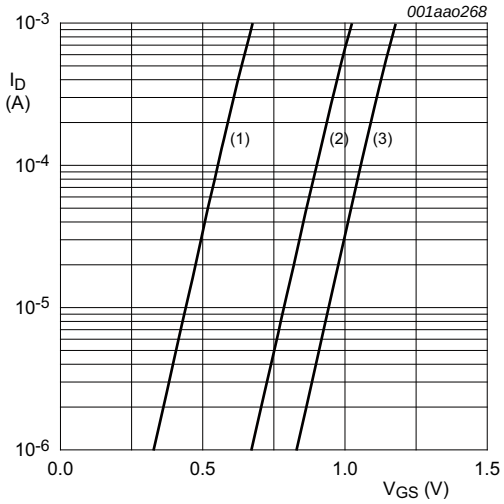
FR4 PCB, mounting pad for drain 1 cm^2

Fig 5. Per transistor: Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



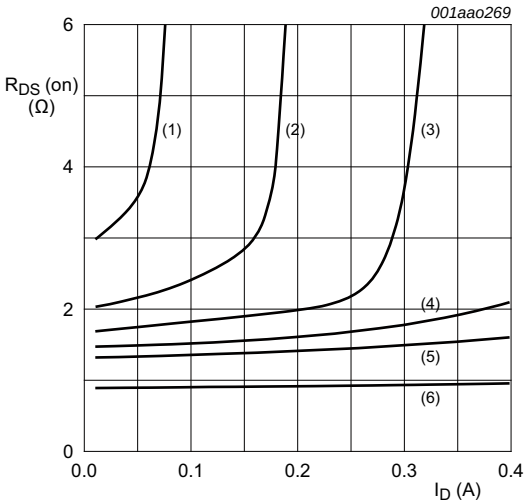
T_j = 25 °C

Fig 6. Output characteristics: drain current as a function of drain-source voltage; typical values



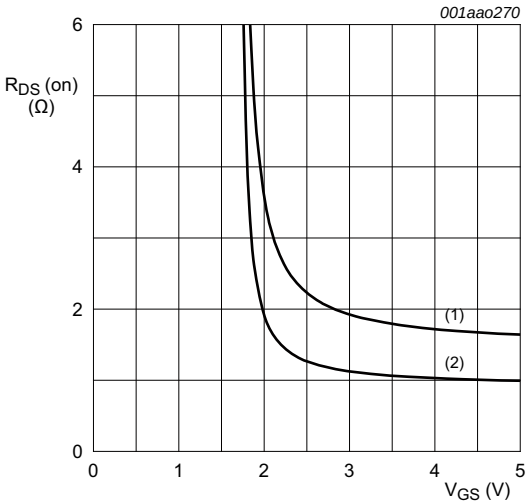
T_j = 25 °C; V_{DS} = 5 V
(1) minimum values
(2) typical values
(3) maximum values

Fig 7. Sub-threshold drain current as a function of gate-source voltage



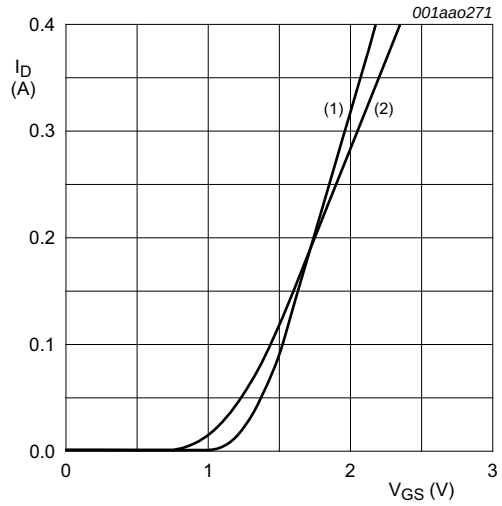
T_j = 25 °C
(1) V_{GS} = 1.5 V
(2) V_{GS} = 1.75 V
(3) V_{GS} = 2.0 V
(4) V_{GS} = 2.25 V
(5) V_{GS} = 2.5 V
(6) V_{GS} = 4.5 V

Fig 8. Drain-source on-state resistance as a function of drain current; typical values



I_D = 350 mA
(1) T_j = 150 °C
(2) T_j = 25 °C

Fig 9. Drain-source on-state resistance as a function of gate-source voltage; typical values

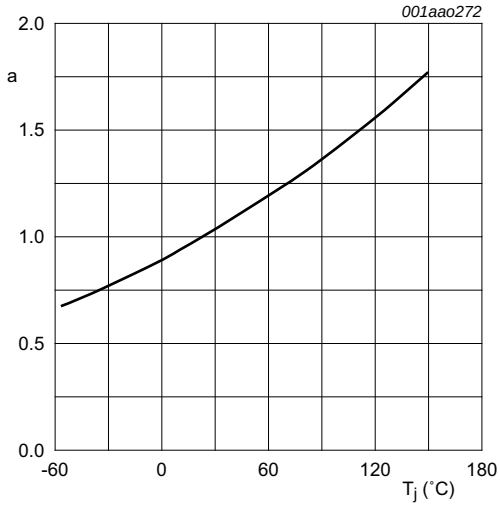


$V_{DS} > I_D \times R_{DSon}$

(1) T_j = 25 °C

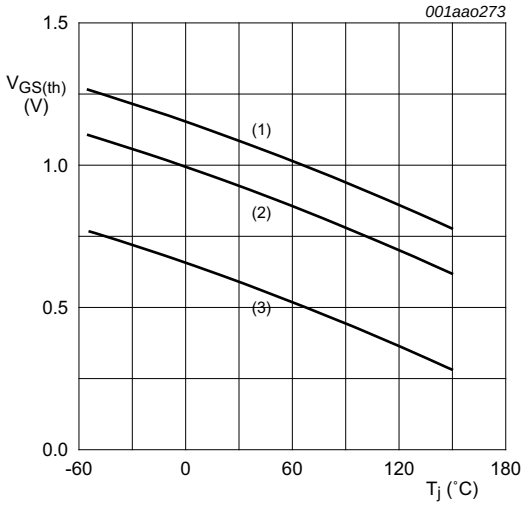
(2) T_j = 150 °C

Fig 10. Transfer characteristics: drain current as a function of gate-source voltage; typical values



$$a = \frac{R_{DSon}}{R_{DSon(25°C)}}$$

Fig 11. Normalized drain-source on-state resistance as a function of junction temperature; typical values



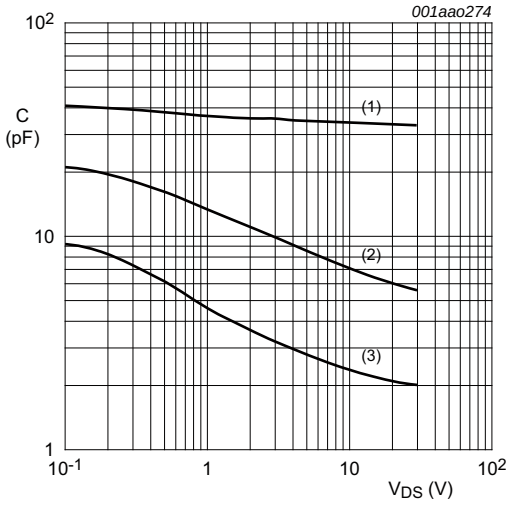
I_D = 0.25 mA; $V_{DS} = V_{GS}$

(1) maximum values

(2) typical values

(3) minimum values

Fig 12. Gate-source threshold voltage as a function of junction temperature



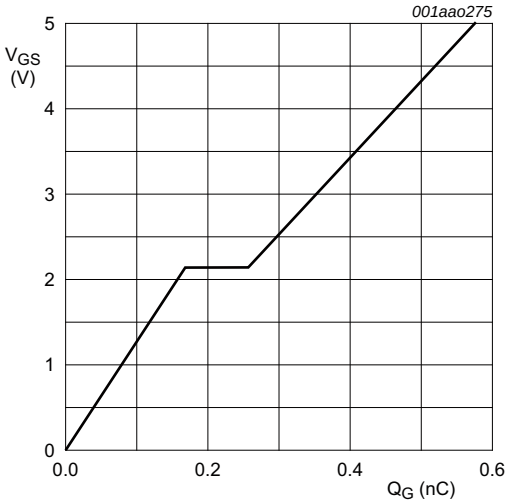
f = 1 MHz; V_{GS} = 0 V

(1)C_{iss}

(2)C_{oss}

(3)C_{rss}

Fig 13. Input, output and reverse transfer capacitances as a function of drain-source voltage; typical values



I_D = 350 mA; V_{DS} = 15 V; T_{amb} = 25 °C

Fig 14. Gate-source voltage as a function of gate charge; typical values

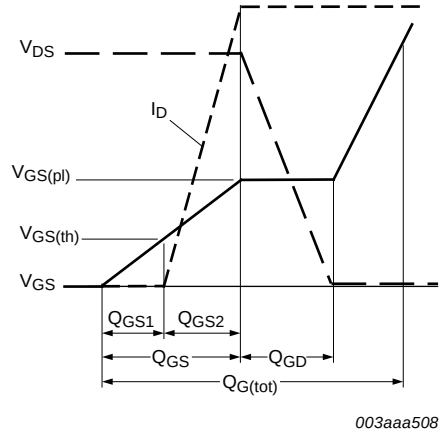
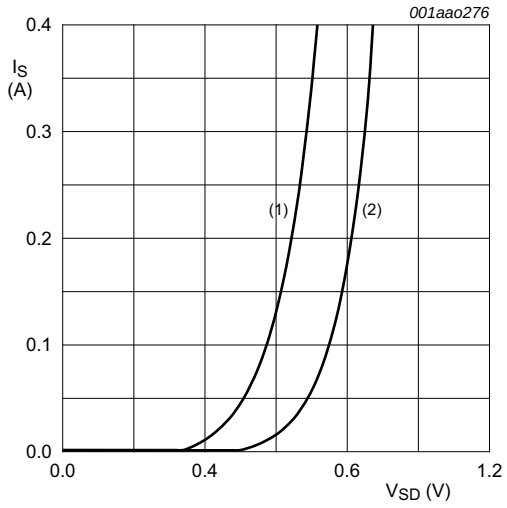


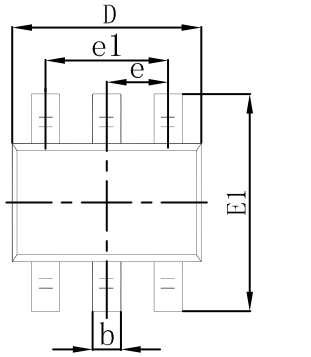
Fig 15. Gate charge waveform definitions

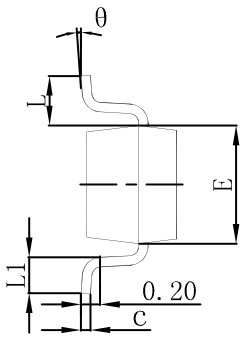


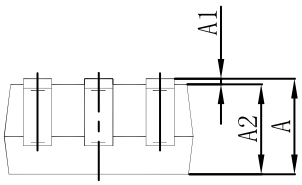
V_{GS} = 0 V
(1) T_j = 150 °C
(2) T_j = 25 °C

Fig 16. Source current as a function of source-drain voltage; typical values

SOT-363 Package Outline Dimensions

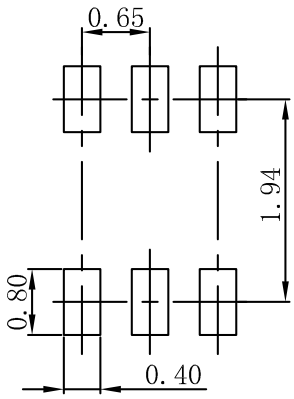






Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
c	0.100	0.150	0.004	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.400	0.085	0.094
e	0.650 TYP		0.026 TYP	
e1	1.200	1.400	0.047	0.055
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

SOT-363 Suggested Pad Layout



Note:
1.Controlling dimension:in millimeters.
2.General tolerance:±0.05mm.
3.The pad layout is for reference purposes only.

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